

# ETSI TS 102 723-3 V1.1.1 (2012-11)



**Intelligent Transport Systems (ITS);  
OSI cross-layer topics;  
Part 3: Interface between management entity and access layer**

---

**Reference**

DTS/ITS-0020017

---

**Keywords**

adaptation, addressing; interface, ITS

**ETSI**

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

---

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

---

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

[http://portal.etsi.org/chaicor/ETSI\\_support.asp](http://portal.etsi.org/chaicor/ETSI_support.asp)

---

**Copyright Notification**

---

No part may be reproduced except as authorized by written permission.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2012.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.  
**3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and  
of the 3GPP Organizational Partners.  
**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

---

# Contents

|  |    |
|--|----|
| Intellectual Property Rights .....             | 6  |
| Foreword.....                                  | 6  |
| Introduction .....                             | 7  |
| 1 Scope .....                                  | 8  |
| 2 References .....                             | 8  |
| 2.1 Normative references .....                 | 8  |
| 2.2 Informative references.....                | 8  |
| 3 Definitions, symbols and abbreviations ..... | 9  |
| 3.1 Definitions .....                          | 9  |
| 3.2 Abbreviations .....                        | 9  |
| 4 Architecture.....                            | 9  |
| 4.1 General .....                              | 9  |
| 4.2 Service access point.....                  | 9  |
| 4.3 Management adaptation entity .....         | 10 |
| 5 MI-COMMAND .....                             | 10 |
| 5.1 MI-COMMAND.request .....                   | 10 |
| 5.1.1 Function .....                           | 10 |
| 5.1.2 Semantics.....                           | 10 |
| 5.1.3 When generated .....                     | 11 |
| 5.1.4 Effect on receipt.....                   | 11 |
| 5.2 MI-COMMAND.confirm.....                    | 11 |
| 5.2.1 Function .....                           | 11 |
| 5.2.2 Semantics.....                           | 11 |
| 5.2.3 When generated .....                     | 12 |
| 5.2.4 Effect on receipt.....                   | 12 |
| 6 MI-REQUEST .....                             | 12 |
| 6.1 MI-REQUEST.request .....                   | 12 |
| 6.1.1 Function .....                           | 12 |
| 6.1.2 Semantics.....                           | 12 |
| 6.1.3 When generated .....                     | 12 |
| 6.1.4 Effect on receipt.....                   | 12 |
| 6.2 MI-REQUEST.confirm .....                   | 13 |
| 6.2.1 Function .....                           | 13 |
| 6.2.2 Semantics.....                           | 13 |
| 6.2.3 When generated .....                     | 13 |
| 6.2.4 Effect on receipt.....                   | 13 |
| 7 MI-SET.....                                  | 13 |
| 7.1 MI-SET.request .....                       | 13 |
| 7.1.1 Function .....                           | 13 |
| 7.1.2 Semantics.....                           | 14 |
| 7.1.3 When generated .....                     | 14 |
| 7.1.4 Effect on receipt.....                   | 14 |
| 7.2 MI-SET.confirm .....                       | 14 |
| 7.2.1 Function .....                           | 14 |
| 7.2.2 Semantics.....                           | 14 |
| 7.2.3 When generated .....                     | 15 |
| 7.2.4 Effect on receipt.....                   | 15 |
| 8 MI-GET .....                                 | 15 |
| 8.1 MI-GET.request .....                       | 15 |
| 8.1.1 Function .....                           | 15 |
| 8.1.2 Semantics.....                           | 15 |

|                             |                               |           |
|-----------------------------|-------------------------------|-----------|
| 8.1.3                       | When generated .....          | 16        |
| 8.1.4                       | Effect on receipt.....        | 16        |
| 8.2                         | MI-GET.confirm .....          | 16        |
| 8.2.1                       | Function .....                | 16        |
| 8.2.2                       | Semantics.....                | 16        |
| 8.2.3                       | When generated .....          | 17        |
| 8.2.4                       | Effect on receipt.....        | 17        |
| 9                           | Management functionality..... | 17        |
| 10                          | IM-DP-COMMAND .....           | 18        |
| 10.1                        | IM-DP-COMMAND.request.....    | 18        |
| 10.1.1                      | Function .....                | 18        |
| 10.1.2                      | Semantics.....                | 18        |
| 10.1.3                      | When generated .....          | 18        |
| 10.1.4                      | Effect on receipt.....        | 18        |
| 10.2                        | IM-DP-COMMAND.confirm .....   | 18        |
| 10.2.1                      | Function .....                | 18        |
| 10.2.2                      | Semantics.....                | 19        |
| 10.2.3                      | When generated .....          | 19        |
| 10.2.4                      | Effect on receipt.....        | 19        |
| 11                          | IM-DP-REQUEST .....           | 19        |
| 11.1                        | IM-DP-REQUEST.request.....    | 19        |
| 11.1.1                      | Function .....                | 19        |
| 11.1.2                      | Semantics.....                | 19        |
| 11.1.3                      | When generated .....          | 20        |
| 11.1.4                      | Effect on receipt.....        | 20        |
| 11.2                        | IM-DP-REQUEST.confirm.....    | 20        |
| 11.2.1                      | Function .....                | 20        |
| 11.2.2                      | Semantics.....                | 20        |
| 11.2.3                      | When generated .....          | 20        |
| 11.2.4                      | Effect on receipt.....        | 21        |
| 12                          | IM-DP-GET .....               | 21        |
| 12.1                        | IM-DP-GET.request.....        | 21        |
| 12.1.1                      | Function .....                | 21        |
| 12.1.2                      | Semantics.....                | 21        |
| 12.1.3                      | When generated .....          | 21        |
| 12.1.4                      | Effect on receipt.....        | 21        |
| 12.2                        | IM-DP-GET.confirm.....        | 21        |
| 12.2.1                      | Function .....                | 21        |
| 12.2.2                      | Semantics.....                | 22        |
| 12.2.3                      | When generated .....          | 22        |
| 12.2.4                      | Effect on receipt.....        | 22        |
| <b>Annex A (normative):</b> | <b>ASN.1 module.....</b>      | <b>23</b> |
| <b>Annex B (normative):</b> | <b>MI-COMMANDs.....</b>       | <b>24</b> |
| B.1                         | Overview .....                | 24        |
| B.2                         | Specification.....            | 24        |
| B.2.1                       | General .....                 | 24        |
| B.2.2                       | RegCmd.....                   | 24        |
| B.2.3                       | CistateChng .....             | 24        |
| B.2.4                       | WakeUp.....                   | 24        |
| B.2.5                       | RTScmd.....                   | 25        |
| B.2.6                       | RTSackCmd .....               | 25        |
| B.2.7                       | Ricmd .....                   | 25        |
| B.2.8                       | ManuCmd.....                  | 25        |
| B.2.9                       | VCIcmd .....                  | 25        |
| B.2.10                      | Monitor.....                  | 25        |
| B.2.11                      | UnitDataCmd .....             | 25        |

|                             |                                     |           |
|-----------------------------|-------------------------------------|-----------|
| <b>Annex C (normative):</b> | <b>CI REQUESTs .....</b>            | <b>26</b> |
| C.1                         | Overview .....                      | 26        |
| C.2                         | Specification.....                  | 26        |
| C.2.1                       | General .....                       | 26        |
| C.2.2                       | RegReq.....                         | 26        |
| C.2.3                       | PrioReg.....                        | 26        |
| C.2.4                       | RTSreq .....                        | 26        |
| C.2.5                       | RTSackReq.....                      | 26        |
| C.2.6                       | Rireq.....                          | 27        |
| C.2.7                       | ManuReq .....                       | 27        |
| C.2.8                       | Events .....                        | 27        |
| C.2.9                       | PosUpdateReq .....                  | 27        |
| C.2.10                      | UnitDataReq.....                    | 27        |
| <b>Annex D (normative):</b> | <b>CI parameters .....</b>          | <b>28</b> |
| D.1                         | Overview .....                      | 28        |
| D.2                         | Specification.....                  | 30        |
| <b>Annex E (normative):</b> | <b>IM-DP-COMMANDs .....</b>         | <b>31</b> |
| E.1                         | Overview .....                      | 31        |
| E.2                         | Specification.....                  | 31        |
| E.2.1                       | General .....                       | 31        |
| E.2.2                       | Monitor.....                        | 31        |
| E.2.3                       | FrameTransmissionNotification ..... | 31        |
| E.2.4                       | FrameReceptionNotification .....    | 31        |
| E.2.5                       | UpdateChannelLoadEstimate .....     | 31        |
| <b>Annex F (normative):</b> | <b>DP REQUESTs .....</b>            | <b>32</b> |
| F.1                         | Overview .....                      | 32        |
| F.2                         | Specification.....                  | 32        |
| F.2.1                       | General .....                       | 32        |
| F.2.2                       | Events .....                        | 32        |
| <b>Annex G (normative):</b> | <b>DP parameters.....</b>           | <b>33</b> |
| G.1                         | Overview .....                      | 33        |
|                             | History .....                       | 34        |

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Intelligent Transport System (ITS).

The present document is part 3 of a multi-part deliverable. Full details of the entire series can be found in part 1 [3].

---

# Introduction

Intelligent Transport Systems (ITS) are systems to support transportation of goods and humans with information and communication technologies in order to efficiently and safely use the transport infrastructure and transport means (cars, trains, planes, ships). Complementary elements of ITS are standardized in various standardisation organisations such as ISO TC204/CEN TC278 and ETSI TC ITS.

The architecture of communications in ITS (ITSC) specified in [1] and [2] introduces the ITS station reference architecture with the internal functional blocks:

- access layer,
- networking & transport layer,
- facilities layer,
- ITS applications;
- management entity,
- security entity,

and the interfaces between these blocks.

Various general addressing mechanisms, the ITS station management information base, and the details of these interfaces specified in this multi-part deliverable complement the general architecture of ITSC.

This multi-part deliverable partly acts as input to the standards making process for the various protocols of ITSC, but also is built from feed-back from this process.

---

# 1 Scope

The present document specifies the MI interface between the management entity and the access layer of the ITS station reference architecture.

Based on the definition of the MI interface as a service access point and the generic services and service primitives specified in [3], the present document provides detailed specifications of possible service primitives.

---

## 2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

### 2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI EN 302 665: "Intelligent Transport Systems (ITS); Communications Architecture".
- [2] ISO 21217: "Intelligent Transport Systems - Communications access for land mobiles (CALM) - Architecture".
- [3] ETSI TS 102 723-1: "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 1: Architecture and addressing schemes".
- [4] ETSI TS 102 723-2: "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 2: Management information base".
- [5] ETSI TS 102 723-10: "Intelligent Transport Systems (ITS); OSI cross-layer topics; Part 10: Interface between access layer and networking & transport layer".
- [6] ITU-T Recommendation X.691: "Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)".
- [7] ISO/DIS 21218: "Intelligent transport systems - Communications access for land mobiles (CALM) - Access technology support".
- [8] ISO/DIS 24102-3: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- ITS station management -- Part 3: Service access points".
- [9] ISO 21214: "Intelligent transport systems -- Communications access for land mobiles (CALM) -- Infra-red systems".
- [10] ETSI TS 102 724: "Intelligent Transport Systems (ITS); Harmonized Channel Specifications for Intelligent Transport Systems operating in the 5 GHz frequency band".

### 2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.



---

## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1] to [4], [7] and [8] apply.

### 3.2 Abbreviations

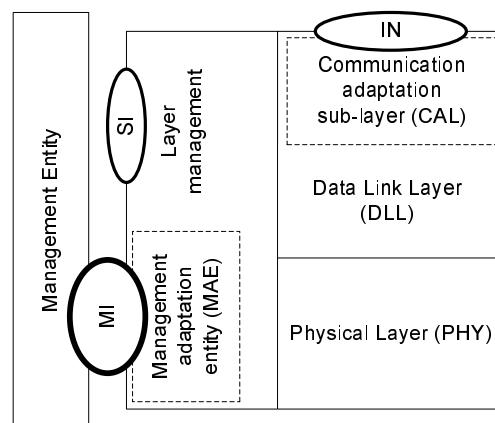
For the purposes of the present document, the abbreviations given in [1] to [4], [7] and [8] apply.

---

## 4 Architecture

### 4.1 General

Figure 1 shows the generic architecture of the access layer and the management entity as specified in [1] and [2]. The MI interface and parts of the layer management including the management adaptation entity (MAE) presented in figure 1 are subject of the present document.



**Figure 1: Architecture**

### 4.2 Service access point

The MI interface is specified as a service access point (SAP) in the present document.

The following generic services applicable for the MI-SAP:

- XY-COMMAND
- XY-REQUEST
- XY-SET
- XY-GET

are specified in [3].

Compliant with the specifications in [3], the management entity presented in figure 1 shall provide the services:

- MI-COMMAND
- MI-REQUEST
- MI-SET
- MI-GET

and the related service primitives.

In addition, the following DCC-Profile specific services shall be provided by the management entity to CIs/VCI that support DCC (in particular, to CIs/VCI on G5A and G5B):

- IM-DP-COMMAND
- IM-DP-REQUEST
- IM-DP-GET

The service primitives do not operate on a CI/VCI, but on a specific (or all) DCC Profiles. DCC Profiles are maintained by the Management Layer; therefore these services shall be offered by the Management Layer to the Access Layer. For that reason, the order of prefix is IM instead of MI. A corresponding IM-DP-SET shall not be provided.

A service access point (SAP) not necessarily is an observable and thus testable interface. The detailed technical specification of MI-SAP, its services and related service primitives at the level of ASN.1 thus is optional. In case this option is selected, the implementation shall be compliant with the ASN.1 specification presented in ISO/DIS 24102-3 [8].

Compliance with the functional specification is required in case the functional behaviour is needed in a specific implementation

Thus the present document specifies elements of a tool-box.

## 4.3 Management adaptation entity

The concept of a management adaptation entity (MAE) is specified in [1] and [2].

Further details are specified in clause 9.

# 5 MI-COMMAND

## 5.1 MI-COMMAND.request

### 5.1.1 Function

The management service primitive MI-COMMAND.request allows the management entity to trigger an action in a specific communication interface (CI).

### 5.1.2 Semantics

The parameters of the management service primitive MI-COMMAND.request shall be as follows:

- MI-COMMAND.request (
  - MAC-ID,
  - CommandRef,
  - MI-Command
 )

**Table 1: Parameters of the service primitive MI-COMMAND.request**

| Name                    | ASN.1 type                    | Valid range              | Description   |
|-------------------------|-------------------------------|--------------------------|---|
| MAC-ID                  | Structure as specified in [3] | Specified in [3]         | Unique identifier of a physically available CI or of a logical instance of it. Logical instances of a CI are named "Virtual Communication Interface" (VCI). |
| CommandRef              | INTEGER                       | 0 to 255                 | Unique cyclic reference number of request.  |
| MI-Command.No<br>.Value | CHOICE                        | Integer number           | See annex B.1.  |
| MI-Command.Value        |                               | Depends on MI-Command.No |   |

See ASN.1 definitions in annex A.

### 5.1.3 When generated

The management service primitive MI-COMMAND.request shall be generated by the management entity when the CI / VCI shall perform an action.

### 5.1.4 Effect on receipt

On receipt of the management service primitive MI-COMMAND.request by a CI / VCI, the requested action shall be performed.

## 5.2 MI-COMMAND.confirm

### 5.2.1 Function

The management service primitive MI-COMMAND.confirm reports the result of a previous MI-COMMAND.request.

### 5.2.2 Semantics

The parameters of the management service primitive MI-COMMAND.confirm shall be as follows:

- MI-COMMAND.confirm (
  - MAC-ID,
  - CommandRef,
  - ErrStatus
 )

**Table 2: Parameters of the service primitive MI-COMMAND.confirm**

| Name       | ASN.1 type                    | Valid range      | Description                               |
|------------|-------------------------------|------------------|---|
| MAC-ID     | Structure as specified in [3] | Specified in [3] | Unique identifier of a CI / VCI.          |
| CommandRef | INTEGER                       | 0 to 255         | Unique cyclic reference number of request |
| ErrStatus  | ENUMERATED                    | Specified in [3] | Indicates error status of request         |

See ASN.1 definitions in annex A.

### 5.2.3 When generated

The management service primitive MI-COMMAND.confirm shall be generated by the CI / VCI upon performance of a previous MI-COMMAND.request.

An undefined COMMAND shall be acknowledged with ErrStatus 5 "INVALID COMMAND/REQUEST NUMBER".

### 5.2.4 Effect on receipt

On receipt of this primitive, the management entity shall evaluate ErrStatus and act accordingly. Details are outside the scope of the present document.

---

## 6 MI-REQUEST

### 6.1 MI-REQUEST.request

#### 6.1.1 Function

The management service primitive MI-REQUEST.request allows a CI / VCI to trigger an action in the management entity.

#### 6.1.2 Semantics

The parameters of the management service primitive MI-COMMAND.request shall be as follows:

- MI-REQUEST.request (
  - MAC-ID,
  - CommandRef,
  - MI-Request
 )

**Table 3: Parameters of the service primitive MI-REQUEST.request**

| Name                    | ASN.1 type                    | Valid range              | Description                               |
|-------------------------|-------------------------------|--------------------------|---|
| MAC-ID                  | Structure as specified in [3] | Specified in [3]         | Unique identifier of a CI / VCI           |
| CommandRef              | INTEGER                       | 0 to 255                 | Unique cyclic reference number of request |
| MI-Request.No<br>.Value | CHOICE                        | Integer number           | See annex C                               |
| MI-Request.Value        |                               | Depends on MI-Request.No |   |

See ASN.1 definitions in annex A.

#### 6.1.3 When generated

The management service primitive MI-REQUEST.request shall be generated by the CI / VCI when the management entity shall perform an action.

#### 6.1.4 Effect on receipt

On receipt of the management service primitive MI-REQUEST.request by the management entity, the requested action shall be performed.

## 6.2 MI-REQUEST.confirm

### 6.2.1 Function

The management service primitive MI-REQUEST.confirm reports the result of a previous MI-REQUEST.request.

### 6.2.2 Semantics

The parameters of the management service primitive MI-REQUEST.confirm shall be as follows:

- MI-REQUEST.confirm (
  - MAC-ID,
  - CommandRef,
  - ErrStatus
 )

**Table 4: Parameters of the service primitive MI-REQUEST.confirm**

| Name       | ASN.1 type                    | Valid range      | Description                               |
|------------|-------------------------------|------------------|---|
| MAC-ID     | Structure as specified in [3] | Specified in [3] | Unique identifier of a CI / VCI.          |
| CommandRef | INTEGER                       | 0 to 255         | Unique cyclic reference number of request |
| ErrStatus  | ENUMERATED                    | Specified in [3] | Indicates error status of request         |

See ASN.1 definitions in annex A.

### 6.2.3 When generated

The management service primitive MI-REQUEST.confirm shall be generated by management entity upon performance of a previous MI-REQUEST.request.

An undefined REQUEST shall be acknowledged with ErrStatus 5 "INVALID COMMAND/REQUEST NUMBER".

### 6.2.4 Effect on receipt

On receipt of this primitive, the CI / VCI entity shall evaluate ErrStatus and act accordingly. Details are outside the scope of the present document.

## 7 MI-SET

### 7.1 MI-SET.request

#### 7.1.1 Function

The management service primitive MI-SET.request allows setting of a CI / VCI parameter by the management entity.

## 7.1.2 Semantics

The parameters of the management service primitive MI-SET.request shall be as follows:

- MI-SET.request (
  - MAC-ID,
  - CommandRef,
  - Sequence of I-Param
 )

**Table 5: Parameters of the service primitive MI-SET.request**

| Name          | ASN.1 type                    | Valid range           | Description                               |
|---------------|-------------------------------|-----------------------|---|
| MAC-ID        | Structure as specified in [3] | Specified in [3].     | Unique identifier of a CI / VCI.          |
| CommandRef    | INTEGER                       | Integer number        | Unique cyclic reference number of request |
|               | INTEGER                       | 0 to 255              | Number of subsequent I-Param elements     |
| I-Param.No    | CHOICE                        | 0 to 255              | See annex D.                              |
| I-Param.Value |                               | Depends on I-Param.No |   |

See ASN.1 definitions in annex A.

## 7.1.3 When generated

The management service primitive MI-SET.request shall be generated by the management entity when CI / VCI parameters shall be set.

## 7.1.4 Effect on receipt

On receipt of the management service primitive MI-SET.request by the CI / VCI, the selected parameters shall be set, if applicable.

## 7.2 MI-SET.confirm

### 7.2.1 Function

The management service primitive MI-SET.confirm reports the result of a previous MI-SET.request

### 7.2.2 Semantics

The parameters of the management service primitive MI-SET.confirm shall be as follows:

- MI-SET.confirm (
  - MAC-ID,
  - CommandRef,
  - Sequence of Errors OPTIONAL
 )

**Table 6: Parameters of the service primitive MI-SET.confirm**

| Name             | ASN.1 type                    | Valid range      | Description  |
|------------------|-------------------------------|------------------|--|
| MAC-ID           | Structure as specified in [3] | Specified in [3] | Unique identifier of a physically available CI or of a logical instance of it. Logical instances of a CI are named "Virtual Communication Interface" (VCI) |
| CommandRef       | INTEGER                       | 0 to 255         | Unique cyclic reference number of request  |
|                  | INTEGER                       | 0 to 255         | Number of subsequent Errors elements   |
| Errors.I-paramNo | INTEGER                       | See annex D      | See annex D  |
| Errors.ErrStatus | ENUMERATED                    | Specified in [3] | Indicates error status of request  |

See ASN.1 definitions in annex A.

### 7.2.3 When generated

The management service primitive MI-COMMAND.confirm shall be generated by the CI / VCI upon performance of a previous MI-COMMAND.request.

A request to set a defined "read only" parameter shall be acknowledged with ErrStatus 7 "ACCESS VIOLATION".

A request to set an undefined parameter shall be acknowledged with ErrStatus 2 "INVALID PARAMETER NUMBER".

A request to set a defined parameter with an illegal value shall be acknowledged with ErrStatus 3 "INVALID PARAMETER VALUE".

A request to set a defined parameter with an illegal type of value shall be acknowledged with either ErrStatus 1 "UNSPECIFIED FAILURE", or with ErrStatus 3 "INVALID PARAMETER VALUE", or with ErrStatus 8 "INVALID TYPE".

### 7.2.4 Effect on receipt

On receipt of this primitive, the management entity shall evaluate Errors and act accordingly. Details are outside the scope of the present document.

## 8 MI-GET

### 8.1 MI-GET.request

#### 8.1.1 Function

The management service primitive MI-GET.request allows retrieving actual values of CI / VCI parameters.

#### 8.1.2 Semantics

The parameters of the management service primitive MI-GET.request shall be as follows:

- MI-GET.request (
  - MAC-ID,
  - CommandRef,
  - Sequence of I-Param.No
 )

**Table 7: Parameters of the service primitive MI-GET.request**

| Name       | ASN.1 type                    | Valid range      | Description                               |
|------------|-------------------------------|------------------|---|
| MAC-ID     | Structure as specified in [3] | Specified in [3] | Unique identifier of a CI / VCI           |
| CommandRef | INTEGER                       | Integer number   | Unique cyclic reference number of request |
|            | INTEGER                       | 0 to 255         | Number of subsequent I-Param.No elements  |
| I-Param.No | INTEGER                       | 0 to 255         | See annex D                               |

See ASN.1 definitions in annex A.

### 8.1.3 When generated

The management service primitive MI-GET.request shall be generated by the management entity when CI / VCI when actual values of CI / VCI parameters shall be retrieved.

### 8.1.4 Effect on receipt

On receipt of the management service primitive MI-GET.request by the CI / VCI, the values of the selected parameters shall be reported to the management entity, if applicable.

## 8.2 MI-GET.confirm

### 8.2.1 Function

The management service primitive MI-GET.confirm reports the result of a previous MI-GET.request.

### 8.2.2 Semantics

The parameters of the management service primitive MI-GET.confirm shall be as follows:

- MI-GET.confirm (
  - MAC-ID,
  - CommandRef,
  - Sequence of I-Param
 )

**Table 8: Parameters of the service primitive MI-GET.confirm**

| Name          | ASN.1 type                    | Valid range      | Description   |
|---------------|-------------------------------|------------------|---|
| MAC-ID        | Structure as specified in [3] | Specified in [3] | Unique identifier of a physically available CI or of a logical instance of it. Logical instances of a CI are named "Virtual Communication Interface" (VCI). |
| CommandRef    | INTEGER                       | 0 to 255         | Unique cyclic reference number of request   |
|               | INTEGER                       | 0 to 255         | Number of subsequent I-Param elements   |
| I-Param.No    | CHOICE                        | See annex D      | Sequence of CI / VCI parameters   |
| I-Param.Value |                               |                  |   |

See ASN.1 definitions in annex A.



### 8.2.3 When generated

The management service primitive MI-GET.confirm shall be generated by the CI / VCI upon performance of a previous MI-GET.request.

A request to get the value of a defined "write only" parameter shall be acknowledged with ErrStatus 7 "ACCESS VIOLATION".

A request to get the value of an undefined parameter shall be acknowledged with ErrStatus 2 "INVALID PARAMETER NUMBER".

### 8.2.4 Effect on receipt

The management entity shall evaluate the parameter values and act accordingly. If any errors occurred in the processing of the related MI-GET.request, the MI-GET.confirm shall contain at least the entry Param.No = 255, where I-Param.Value shall explain the details of the error as specified in annex D.

Further details are outside the scope of present document.

## 9 Management functionality

The local management presented in figure 1 supports the functionality related to the MI-SAP.

This functionality shall be as specified in [7] and as further specified in the present document. A specification in the present document shall prevail a specification in [7].

Every CI shall maintain its state according to the state diagram in figure 2.

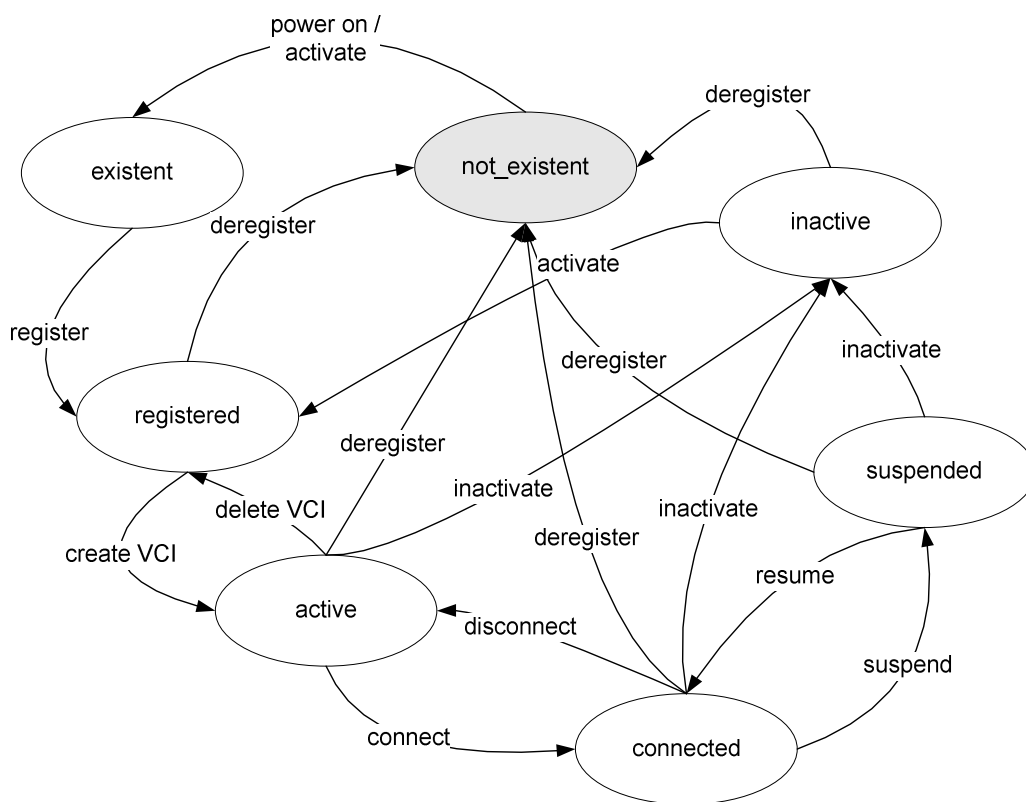


Figure 2: CI state diagram

NOTE: This state diagram is identical to the one presented in [7] except the name of a single transition (resume). The correct transition name is already used in [8].

## 10 IM-DP-COMMAND

### 10.1 IM-DP-COMMAND.request

#### 10.1.1 Function

The management service primitive IM-DP-COMMAND.request allows the access-layer entity to trigger an action for a specific DCC Profile (DP) at the management entity.

#### 10.1.2 Semantics

The parameters of the management service primitive IM-DP-COMMAND.request shall be as follows:

- IM-DP-COMMAND.request (
  - DP-ID,
  - CommandRef,
  - IM-DP-Command
 )

**Table 9: Parameters of the service primitive IM-DP-COMMAND.request**

| Name                       | ASN.1 type | Valid range                 | Description                               |
|----------------------------|------------|-----------------------------|---|
| DP-ID                      | INTEGER    | 0 to 255                    | Unique identifier of a DCC Profile        |
| CommandRef                 | INTEGER    | 0 to 255                    | Unique cyclic reference number of request |
| IM-DP-Command.No<br>.Value | CHOICE     | Integer number              | See annex E                               |
| IM-DP-Command.Value        |            | Depends on IM-DP-Command.No |   |

#### 10.1.3 When generated

The management service primitive IM-DP-COMMAND.request shall be generated by the access-layer entity when the management entity has to perform an action on a DCC Profile.

#### 10.1.4 Effect on receipt

On receipt of the management service primitive IM-DP-COMMAND.request by the management entity, the requested action shall be performed.

## 10.2 IM-DP-COMMAND.confirm

### 10.2.1 Function

The management service primitive IM-DP-COMMAND.confirm reports the result of a previous IM-DP-COMMAND.request.

## 10.2.2 Semantics

The parameters of the management service primitive IM-DP-COMMAND.confirm shall be as follows:

- IM-DP-COMMAND.confirm (
  - DP-ID,
  - CommandRef,
  - ErrStatus
 )

**Table 10: Parameters of the service primitive IM-DP-COMMAND.confirm**

| Name       | ASN.1 type | Valid range      | Description                               |
|------------|------------|------------------|---|
| DP-ID      | INTEGER    | 0 to 255         | Unique identifier of a DCC Profile        |
| CommandRef | INTEGER    | 0 to 255         | Unique cyclic reference number of request |
| ErrStatus  | ENUMERATED | Specified in [3] | Indicates error status of request         |

## 10.2.3 When generated

The management service primitive IM-DP-COMMAND.confirm shall be generated by the management entity upon performance of a previous IM-DP-COMMAND.request.

An undefined COMMAND shall be acknowledged with ErrStatus 5 "INVALID COMMAND/REQUEST NUMBER".

## 10.2.4 Effect on receipt

On receipt of this primitive, the access-layer entity shall evaluate ErrStatus and act accordingly. Details are outside the scope of the present document.

# 11 IM-DP-REQUEST

## 11.1 IM-DP-REQUEST.request

### 11.1.1 Function

The management service primitive IM-DP-REQUEST.request allows the management entity to trigger an action in the access-layer entity.

### 11.1.2 Semantics

The parameters of the management service primitive IM-DP-COMMAND.request shall be as follows:

- IM-DP-REQUEST.request (
  - DP-ID,
  - CommandRef,
  - MI-Request
 )

**Table 11: Parameters of the service primitive IM-DP-REQUEST.request**

| Name                       | ASN.1 type | Valid range                 | Description                               |
|----------------------------|------------|-----------------------------|---|
| DP-ID                      | INTEGER    | 0 to 255                    | Unique identifier of a DCC Profile        |
| CommandRef                 | INTEGER    | 0 to 255                    | Unique cyclic reference number of request |
| IM-DP-Request.No<br>.Value | CHOICE     | Integer number              | See annex F                               |
| IM-DP-Request.Value        |            | Depends on IM-DP-Request.No |   |

### 11.1.3 When generated

The management service primitive IM-DP-REQUEST.request shall be generated by the management entity when the access-layer entity should perform an action.

### 11.1.4 Effect on receipt

On receipt of the management service primitive IM-DP-REQUEST.request by the access-layer entity, the requested action shall be performed.

## 11.2 IM-DP-REQUEST.confirm

### 11.2.1 Function

The management service primitive IM-DP-REQUEST.confirm reports the result of a previous IM-DP-REQUEST.request.

### 11.2.2 Semantics

The parameters of the management service primitive IM-DP-REQUEST.confirm shall be as follows:

- IM-DP-REQUEST.confirm (
  - DP-ID,
  - CommandRef,
  - ErrStatus
 )

**Table 12: Parameters of the service primitive IM-DP-REQUEST.confirm**

| Name       | ASN.1 type | Valid range      | Description                               |
|------------|------------|------------------|---|
| DP-ID      | INTEGER    | 0 to 255         | Unique identifier of a DCC Profile.       |
| CommandRef | INTEGER    | 0 to 255         | Unique cyclic reference number of request |
| ErrStatus  | ENUMERATED | Specified in [3] | Indicates error status of request         |

### 11.2.3 When generated

The management service primitive IM-DP-REQUEST.confirm shall be generated by the access-layer entity upon performance of a previous IM-DP-REQUEST.request.

An undefined REQUEST shall be acknowledged with ErrStatus 5 "INVALID COMMAND/REQUEST NUMBER".

## 11.2.4 Effect on receipt

On receipt of this primitive, the management entity shall evaluate ErrStatus and act accordingly. Details are outside the scope of the present document.

---

# 12 IM-DP-GET

## 12.1 IM-DP-GET.request

### 12.1.1 Function

The management service primitive IM-DP-GET.request allows retrieving actual values of DCC Profile parameters by the access layer entity.

### 12.1.2 Semantics

The parameters of the management service primitive IM-DP-GET.request shall be as follows:

- IM-DP-GET.request (
  - DP-ID,
  - CommandRef,
  - Sequence of I-Param.No
 )

**Table 13: Parameters of the service primitive IM-DP-GET.request**

| Name       | ASN.1 type | Valid range    | Description                               |
|------------|------------|----------------|---|
| DP-ID      | INTEGER    | 0 to 255       | Unique identifier of a DCC Profile        |
| CommandRef | INTEGER    | Integer number | Unique cyclic reference number of request |
|            | INTEGER    | 0 to 255       | Number of subsequent I-Param.No elements  |
| D-Param.No | INTEGER    | 0 to 255       | See annex G                               |

See ASN.1 definitions in annex A.

### 12.1.3 When generated

The management service primitive IM-DP-GET.request shall be generated by the access-layer entity when actual values of DCC Profile parameters have to be retrieved from the management entity.

### 12.1.4 Effect on receipt

On receipt of the management service primitive IM-DP-GET.request by the management entity, the values of the selected parameters shall be reported to the access-layer entity, if applicable.

## 12.2 IM-DP-GET.confirm

### 12.2.1 Function

The management service primitive IM-DP-GET.confirm reports the result of a previous MI-GET.request.

## 12.2.2 Semantics

The parameters of the management service primitive IM-DP-GET.confirm shall be as follows:

- IM-DP-GET.confirm (
  - DP-ID,
  - CommandRef,
  - Sequence of D-Param
 )

**Table 14: Parameters of the service primitive IM-DP-GET.confirm**

| Name          | ASN.1 type | Valid range | Description  |
|---------------|------------|-------------|--|
| DP-ID         | INTEGER    | 0 to 255    | Unique identifier of a DCC Profile. The values 0 (NO-DP-ID) and 255 (ALL-DP-ID) are reserved |
| CommandRef    | INTEGER    | 0 to 255    | Unique cyclic reference number of request  |
|               | INTEGER    | 0 to 255    | Number of subsequent I-Param elements  |
| D-Param.No    | CHOICE     | See annex G | Sequence of DCC Profile parameters   |
| D-Param.Value |            |             |  |

## 12.2.3 When generated

The management service primitive IM-DP-GET.confirm shall be generated by the management entity upon performance of a previous IM-DP-GET.request.

A request to get the value of a defined "write only" parameter shall be acknowledged with ErrStatus 7 "ACCESS VIOLATION".

A request to get the value of an undefined parameter shall be acknowledged with ErrStatus 2 "INVALID PARAMETER NUMBER".

## 12.2.4 Effect on receipt

The access-layer entity shall evaluate the parameter values and act accordingly. If any errors occurred in the processing of the related IM-DP-GET.request, the IM-DP-GET.confirm shall contain at least the entry Param.No = 255, where D-Param.Value shall explain the details of the error as specified in annex G.

Further details are outside the scope of the present document.

---

## Annex A (normative): ASN.1 module

The main ASN.1 module of the present document is **ITSCLO1 { itu-t(0) identified-organization(4) etsi(0) itsDomain(5) wg2(2) itscl(102723) part1 (1)}** as specified below. The encoding shall be packet encoding rules (PER) as specified in [6].

```
ITSCLO3 { itu-t(0) identified-organization(4) etsi(0) itsDomain(5) wg2(2) itscl(102723) part3 (3)
version1(1) } DEFINITIONS ::= BEGIN

IMPORTS
oidITSwg2 FROM ITSreg {itu-t(0) identified-organization(4) etsi(0) itsDomain(5) wg2(2) version1
(1)};

-- Types

-- Values
iTScLTSversion UTF8String (SIZE(7)) ::= "TS1.1.1" - version 1.1.1 of this TS

oidTS102723p3 OBJECT IDENTIFIER ::= { oidITSwg2 itscl(2723) part3(3) }

-- The ASN.1 specification has been checked for conformance to the ASN.1 standards by OSS ASN-1STEP
END
```

## Annex B (normative): MI-COMMANDS

### B.1 Overview

A command issued by the management entity to the access layer via the MI-SAP is referred to as MI-COMMAND. MI-COMMANDS are uniquely distinguished by the reference number MI-Command.No, see table 1. In addition, each MI-COMMAND is identified by a unique name. A description of MI-COMMANDS is presented in table B.1. Table B.1 complements the specification in [7]. Details of each command shall be as presented in clause B.2.

**Table B.1: COMMANDS**

| MI-Command.No | COMMAND name | Description  |
|---------------|--------------|--|
| 0             | RegCmd       | Acknowledgement of ReqReq [7]  |
| 1             | CistateChng  | Change of CI status [7]  |
| 2             | WakeUp       | Stops or activates wake-up signal transmission [7]                           |
| 3             | RTScmd       | Information on a "Request To Send" (RTS) for cross-CI prioritization [7] [8] |
| 4             | RTSackCmd    | Acknowledgement of an RTSreq [7]   |
| 5             |              | Reserved for future use.   |
| 6             |              | Reserved for future use.   |
| 7             | Ricmd        | Acknowledgement of Rireq [7]   |
| 8             | ManuCmd      | Manufacturer-specific access to a CI [7]                                     |
| 9             | VClcmd       | Request to create, reset or delete a VCI [7]                                 |
| 10            | Monitor      | Request to monitor parameters of a CI / VCI [7]                              |
| 11 to 254     |              | Reserved for future use.   |
| 255           | UnitDataCmd  | Request transmission of a management data packet [7]                         |

MI-Command.No is equal to the ASN.1 CHOICE tag of MI-Command, see annex A.

### B.2 Specification

#### B.2.1 General

MI-COMMANDS shall be as specified in the following clauses. The ASN.1 details shall be as specified in annex A.

#### B.2.2 RegCmd

This COMMAND shall be used by the management entity to acknowledge a registration request from a CI as specified in [7].

#### B.2.3 CistateChng

This COMMAND shall be used by the management entity to request a change of CI state as specified in [7].

#### B.2.4 WakeUp

This COMMAND shall be used by the management entity to start / stop transmission of wake-up signals in a CI state as specified in [7].



## B.2.5 RTScmd

This COMMAND shall be used by the management entity to request prioritization over interfering Cis as specified in [7].

## B.2.6 RTSackCmd

This COMMAND shall be used by the management entity to acknowledge a prioritization request from a Cis as specified in [7].

## B.2.7 Ricmd

This COMMAND shall be used by the management entity to forward a management data packet to a CI containing regulatory information as received via another Cis as specified in [7].

## B.2.8 ManuCmd

This COMMAND shall be used by the management entity to allow a manufacturer of a CI to access his CI in a manufacturer-specific way as specified in [7].

## B.2.9 VClcmd

This COMMAND shall be used by the management entity to request creation, deletion or reset of a CI as specified in [7].

## B.2.10 Monitor

This COMMAND shall be used by the management entity to start / stop notification of changes of values of parameters of a CI (I-Param) as specified in [7].

## B.2.11 UnitDataCmd

This COMMAND shall be used by the management entity to request transmission of a management data packet on a management frame.

## Annex C (normative): CI REQUESTS

### C.1 Overview

A command issued by a CI / VCI to the management entity via the MI-SAP is referred to as MI-REQUEST. MI-REQUESTSs are uniquely distinguished by the reference number MI-Request.No, see table 3. In addition, each MI-REQUEST is identified by a unique name. A description of MI-REQUESTs is presented in table C.1. Table C.1 complements the specification in [7]. Details of each command shall be as presented in clause C.1.

**Table C.1: REQUESTS**

| MI-Request.No | REQUEST name | Description  |
|---------------|--------------|--|
| 0             | RegReq       | Request to register the CI [7]                                     |
| 1             | PrioReq      | Register for cross-CI prioritization [7]                           |
| 2             | RTSreq       | Dummy "Request To Send" (RTS) for cross-CI prioritization [7] [8]. |
| 3             | RTSackReq    | Acknowledgement of RTScmd [7]                                      |
| 4             |              | Reserved for future use  |
| 5             |              | Reserved for future use  |
| 6             |              | Reserved for future use  |
| 7             | Rireq        | Request to get regulatory information (RI) via another CI [7]      |
| 8             | ManuReq      | Optional reply to ManuCmd [7]                                      |
| 9             | Events       | Notification of an event [7]                                       |
| 10            | PosUpdateReq | Request to receive position updates [7]                            |
| 11 to 254     |              | Reserved for future use  |
| 255           | UnitDataReq  | Notification of reception of a management data packet              |

MI-Request.No is equal to the ASN.1 CHOICE tag of MI-Request, see annex A.

### C.2 Specification

#### C.2.1 General

MI-REQUESTs shall be as specified in the following clauses. The ASN.1 details shall be as specified in annex A.

#### C.2.2 RegReq

This REQUEST shall be used by the MAE to register a CI as part of an ITS station as specified in [7].

#### C.2.3 PrioReq

This REQUEST shall be used by the MAE to register a CI for the cross-CI prioritization procedure specified in [7].

#### C.2.4 RTSreq

This REQUEST shall be used by the MAE to request / release cross-CI prioritization as specified in [7].

#### C.2.5 RTSackReq

This REQUEST shall be used by the MAE to acknowledge a cross-CI prioritization request as specified in [7].

## C.2.6 Rireq

This REQUEST shall be used by the MAE to request retrieval of regulatory information via another CI as specified in [7].

## C.2.7 ManuReq

This REQUEST shall be used by the MAE to reply to a manufacturer specific access to the CI as specified in [7].

## C.2.8 Events

This REQUEST shall be used by the MAE to notify an event to the management entity as specified in [7].

## C.2.9 PosUpdateReq

This REQUEST shall be used by the MAE to manage reception of updates of the actual position of the ITS station as specified in [7]. Updates of the position shall be written in I-Param 41 "KinematicVector" by means of the MI-SET service.

## C.2.10 UnitDataReq

This REQUEST shall be used by the MAE to notify reception of a management data packet contained in a management frame as specified in [7].

## Annex D (normative): CI parameters

### D.1 Overview

Parameters of communication interfaces (CI parameters) are referred to as "I-Param" in the SET and GET service primitives as specified in clauses 7 and 8.

Parameters shall be as specified in [7] and as further specified in the present document. A specification in the present document shall prevail a specification in [7].

Table D.1 complements the specification in [7]. It presents the relation between parameter number "I-Param.No" and parameter name as used in the SET and GET services, and provides a short description of parameters. A detailed specification is provided in clause D.2.

"I-Param.No" is equal to the ASN.1 CHOICE tag of I-Param, see annex A.

"CommProfile" shows which parameters may be part of the Communication profile, see parameter 20.

"Access" specifies the possible access to the parameter:

- R: Read by management entity only, includes notify by CI/VCI;
- W: Write by management entity only;
- RW: Read and Write;
- N: Notify by CI only;
- NW: Notify by CI and Write by management entity;
- x: to be defined by medium standard.

"Owner" specifies the owner of the parameter:

- CI: a physically available CI;
- VCI: a logical instance of a CI;
- x: to be defined by standard of access technology.

NOTE: A parameter may apply only for a limited number of access technologies.

**Table D.1: List of I-Param**

| I-Param .No | Name of I-Param | Comm-Profile | Access | Description   | Owner |
|-------------|-----------------|--------------|--------|---|-------|
| 0           |                 |              |        | Subject to redefinition in [7].   |       |
| 1           |                 |              |        | Subject to redefinition in [7].   |       |
| 2           |                 |              |        | Subject to redefinition in [7].   |       |
| 3           | Rxsensitivity   | Yes          | RW     | Medium specific reference number of RX sensitivity. See note 1.                           | VCI   |
| 4           | Txpower         | Yes          | RW     | Medium specific reference number of TX power. See note 2.                                 | VCI   |
| 5           | DataRate        | Yes          | RW     | Data rate in the link in units of 100 bit/s.  | VCI   |
| 6           | DataRateNW      | Yes          | R      | Estimate of average data rate available at the IN-SAP in 100 bit/s. See notes 3, 4 and 5. | VCI   |
| 7           | DataRatesNW     | Yes          | R      | Minimum and maximum possible value of DataRateNW.   | VCI   |

| I-Param No | Name of I-Param       | Comm-Profile | Access | Description   | Owner   |
|------------|-----------------------|--------------|--------|---|---------|
| 8          | DataRateNWreq         | No           | RW     | Minimum required value of DataRateNW. This value defines the possible number of time slots (=peer stations) served in a TDMA scheme.  | CI      |
| 9          | Directivity           | Yes          | R, RW  | Characteristics of beam. See note 6.  | CI, VCI |
| 10         | BlockLength           | Yes          | RW     | Maximum length of LPDU.   | VCI     |
| 11         | MinimumUserPriority   | Yes          | RW     | Minimum value of user priority needed to use the VCI. See note 7.   | VCI     |
|            |                       |              |        | Subject to redefinition in [7].   |         |
| 13         | InactivityTimeLimit   | No           | RW     | Maximum allowed idle time for a RX-VCI.   | VCI     |
| 14         | DistancePeer          | No           | R      | Distance in 1/10 m to peer station measured by the CI.  | VCI     |
| 15         | Ciclass               | Yes          | R      | Communications interface class.   | CI      |
| 16         | CommRangeRef          | Yes          | R      | Estimate of size of communication zone in 1/10 m. See note 8.   | VCI     |
| 17         | Cost                  | No           | R      | Price information. Cost of communication in terms of money.<br>Per byte / per second / flat-rate / free of charge.<br>Amount per unit (optional).   | VCI     |
| 18         | Reliability           | No           | R      | Real-time measure of reliability of CI.   | VCI     |
| 19         | Properties            | No           | R      | Properties of a CI.<br>List of all communication profile parameters defined for the CI showing the complete range of values.  | CI      |
| 20         | CommProfil            | No           | R      | Communication profile.<br>Contains the set of parameter values that define the actual communication properties of a VCI. A default profile shall be defined for each medium.<br>The column Comm-Profile of this table tells, which parameters may be part of the Communication profile. | VCI     |
| 21         |                       |              |        | Subject to redefinition in [7]  |         |
| 22         | MedType               | Yes          | R      | Enumerator indicating type of access technology   | CI      |
| 23         | Nwsupport             | Yes          | R      | Indication of supported network communication protocols, e.g. GeoNetworking, IP over GeoNetworking, CALM FAST, Ipv6, ...  | VCI     |
| 24         | CiaccessClass         | Yes          | R      | CI access class.  | CI      |
| 25         | RegulatoryInformation | No           | RW     | RI data structure containing either the actually valid regulatory information, or a statement that no regulation is known or applicable.  | CI      |
| 26         | FreeAirTime           | Yes          | RW     | Gap between subsequent TDMA frames in ms.   | VCI     |
| 27         | SIMpin                | No           | W      | PIN needed to access a SIM card.  | CI      |
| 28         | ProviderInfo          | No           | W      | Access information for a provider.  | CI      |
| 29         | MediumUsage           | No           | R      | Percentage of active usage of medium.   | CI      |
| 30         | MedUseObservationTime | No           | RW     | Observation time used to calculate MediumUsage.   | CI      |
| 31         |                       |              |        | Subject to redefinition in [7]  |         |
| 32         | QueueAlarmThreshold   | No           | RW     | Threshold indicating the minimum level of usage of a transmit queue in a CI above which the management entity shall be notified.  | CI      |
| 33         | QueueLevel            | No           | N      | Actual level in a transmit queue for a specific priority.   | CI      |
| 34         | MACaddress            | Yes          | R      | Globally assigned MAC address of CI.  | CI      |
| 35         | MACaddrTemp           | Yes          | RW     | Actually used MAC address of CI / VCI.  | VCI     |

| I-Param .No | Name of I-Param      | Comm-Profile | Access | Description   | Owner |
|-------------|----------------------|--------------|--------|---|-------|
| 36          | TimeoutRegister      | No           | RW     | Time out to be used during registration of a CI. Shall be set to a random value at time of integration of the CI. May be set by the management entity to a value as appropriate in the CALM system. | CI    |
| 37          |                      |              |        | Subject to redefinition in [7].   |       |
| 38          | VirtualCI            | No           | R      | SerialNumber of all VCIs of the selected CI being alive.  | CI    |
| 39          | FrameLengthMax       | Yes          | RW     | Maximum length of a TDMA frame in ms.   | VCI   |
| 40          | KinematicVectorIn    | No           | W      | Kinematic vector of ITS station as provided to CI.  | CI    |
| 41          | KinematicVectorOut   | No           | R      | Kinematic vector of ITS station as estimated by CI.   | CI    |
| 42          | Cistatus             | No           | R      | Status of CI.   | CI    |
| 43          | Notify               | No           | R      | List of parameters for automatic notification   | VCI   |
| 44          | MinPrioCrossCI       | No           | RW     | Minimum required user priority in order to be able to request cross-CI prioritization.  | CI    |
| 45          |                      |              |        |   |       |
| 46          | PeerMAC              | No           | R      | MAC address of peer station related to the VCI.   | VCI   |
| 47          | QueueLowThreshold    | No           | RW     | Threshold indicating the maximum level of usage of a transmit queue in a CI below which the management entity shall be notified.  |       |
| 48          | PeerRXpower          | No           | R      | RX power as estimated at the peer station.  | VCI   |
| 49          | TxpowMax             | Yes          | R      | Maximum allowed transmit power EIRP in dBm.   | VCI   |
| 50          | ManufacturerDeviceID | No           | R      | Text string to be defined by manufacturer, clearly identifying the CI.  | CI    |
| 51          | Connect              | Yes          | R      | Flag, indicating whether CI will connect automatically, or manually upon request.   | CI    |
| 52 to 253   |                      |              |        | Reserved for future use.  |       |
| 254         | MediumParam          | No           | x      | Medium specific parameter as specified in a standard on access technology.  | x     |
| 255         | Errors               | No           | N      | Virtual parameter, indicating errors in MI-GET.confirm.<br>Not to be used in MI-SET and in MI-GET.request.  |       |

NOTE 1: In [9] this is RX-CLASS (1-11).  
NOTE 2: In [9] this is TX-CLASS (1-16).  
NOTE 3: The value of this parameter is based on the assumption of a reliable, error-free communications link.  
NOTE 4: The value of this parameter may depend on the actual operational load of the CI, e.g. in case of a TDMA scheme and multiple simultaneous users.  
NOTE 5: In a TDMA scheme this value depends on the number of timeslots (=peer devices) served in a single TDMA frame.  
NOTE 6: CI parameter: Read only  
VCI parameter: Read/Write  
NOTE 7: Default value defined.  
NOTE 8: Value is derived from Txpower, Rx sensitivity and the properties of the reference station. To be calculated by the layer management [1] of the CI.

## D.2 Specification

Details of the parameters listed in table D.1 shall be as specified in [7] or as specified in this clause. A specification in this clause shall prevail a specification in [7].

None in the present document.

---

## Annex E (normative): IM-DP-COMMANDS

### E.1 Overview

A DCC Profile command issued by the access-layer entity to the management entity is referred to as IM-DP-COMMAND. IM-DP-COMMANDS are uniquely distinguished by the reference number IM-DP-Command.No, see Table E.1. In addition, each IM-DP-COMMAND is identified by a unique name. A description of IM-DP-COMMANDS is also presented in Table E.1. Details of each command shall be as presented in clause E.2.

**Table E.1: IM-DP-COMMANDS**

| IM-DP-Command.No | COMMAND name                  | Description  |
|------------------|-------------------------------|--|
| 0                | RegCmd                        | Acknowledgement of ReqReq                                  |
| 1 to 9           |                               | Reserved for future use.                                   |
| 10               | Monitor                       | Request to monitor parameters of a DCC Profile             |
| 11               | FrameTransmissionNotification | Upon transmission; includes actual transmission parameters |
| 12               | FrameReceptionNotification    | Upon reception of a frame; includes RSSI                   |
| 13               | UpdateChannelLoadEstimate     | Periodically, as per I-Param Notify (see Table D.1).       |
| 14 to 255        |                               | Reserved for future use.                                   |

---

### E.2 Specification

#### E.2.1 General

IM-DP-COMMANDS shall be as specified in the following clauses.

#### E.2.2 Monitor

This COMMAND shall be used by the management entity to start / stop notification of changes of values of parameters of a DCC Profile (D-Param).

#### E.2.3 FrameTransmissionNotification

This COMMAND shall be used by the access-layer entity to notify the management entity of the end of the transmission of a frame. The notification shall include the actual transmit parameters as specified in [5].

#### E.2.4 FrameReceptionNotification

This COMMAND shall be used by the access-layer entity to notify the management entity of the end of the reception of a frame. The notification shall include the actual Received Signal Strength Indicator.

#### E.2.5 UpdateChannelLoadEstimate

This COMMAND shall be used by the access-layer entity to update the channel-load estimates maintained by the management entity.

---

## Annex F (normative): DP REQUESTs

### F.1 Overview

A DCC-Profile command issued by the management entity to the access-layer entity via the MI-SAP is referred to as IM-DP-REQUEST. IM-DP-REQUESTs are uniquely distinguished by the reference number IM-DP-Request.No, see table F.1. In addition, each IM-DP-REQUEST is identified by a unique name. A description of IM-DP-REQUESTs is also presented in table F.1. Details of each command shall be as presented in clause F.2.

**Table F.1: IM-DP-REQUESTs**

| IM-DP-Request.No | REQUEST name | Description              |
|------------------|--------------|--------------------------|
| 0                |              | Reserved                 |
| 1 to 7           |              | Reserved for future use  |
| 8                |              | Reserved                 |
| 9                | Events       | Notification of an event |
| 10 to 255        |              | Reserved for future use  |

---

### F.2 Specification

#### F.2.1 General

IM-DP-REQUESTs shall be as specified in the following clauses.

#### F.2.2 Events

This REQUEST shall be used by the management entity to notify a DCC Profile event to the access-layer entity.



# Annex G (normative): DP parameters

## G.1 Overview

Parameters of DCC Profiles (DP) are referred to as "D-Param" in the GET service primitive as specified in clause 13. The parameters are maintained by the management entity.

Table D.1 presents the relation between parameter number "D-Param.No" and parameter name as used in the GET service, and provides a short description of parameters. A detailed specification is provided in clause G.2.

"Access" specifies the possible access to the parameter:

- R: Read by access-layer entity only (including notifications to the access-layer entity);
- W: Write by access-layer entity only;
- RW: Read and Write;
- N: Notify to access-layer entity only;
- NW: Notify and Write.

All parameters are owned by the respective DCC Profiles.

**Table G.1: List of D-Param**

| D-Param .No | Name of D-Param | Access | Description  |
|-------------|-----------------|--------|--|
| 0 to 3      |                 |        | Reserved for future use  |
| 4           | TxPower         | R      | Maximum allowed transmit power for this DCC Profile. May be 'UNSPECIFIED', in which case the transmit power is unaffected by the DCC Profile |
| 5 to 9      |                 |        | Reserved for future use  |
| 100         | VCI             | R      | Unique identification of the VCI to which traffic in this DCC Profile will be sent.  |
|             | ChannelId       | R      | Unique identification of the channel to which traffic in this DCC Profile will be sent   |
| 101         | PriorityQueue   | R      | Identification of the priority queue (e.g. in EDCA) to which frames will be assigned   |
| 106         | MCS             | R      | The Modulation/Coding Scheme to use for this DCC profile. May be 'UNSPECIFIED', in which case the DCC Profile will not affect the MCS        |
| 107         | ToffTime        | R      | The minimum time between frame transmissions for this DCC profile, see [10]  |

---

## History

| <b>Document history</b> |               |             |
|-------------------------|---------------|-------------|
| V1.1.1                  | November 2012 | Publication |
|                         |               |             |
|                         |               |             |
|                         |               |             |
|                         |               |             |